DRAFT

DELAWARE DEPARTMENT OF TRANSPORTATION
PRECONSTRUCTION

CADD STANDARDS

AND

GRAPHICS MANUAL

***** DATED 01-JAN-97 *****

Approved _____

Date

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2.3.1 Preconstruction CADD Workstations

Logical Drive Mapping

Letter	Purpose
M: \\preconl\DMS_SERVER	Falcon/DMS
N: \\byers2\DESIGN	CADD raster files
O: \\byers2\CONTRACT	OCE9800 Job ticket
P: serl:/usr4/pub	B/W Check Plot queue
Q: \\byers2\plotque	OCE9800 plot queue
S: serl:/usr4/dopdone	Infrared Digital Orthophotos
T: \\byersl\oce9400	OCE9400 B/W plot queue
Y: \\preconl\y	CADD vector File
Z: \\byers2\plotcfg	CADNET configuration

3.0 DIRECTORY NAMES

Home directory names for Preconstruction personnel are user log-in names. Working directories for construction projects shall be created under the home directory using the construction contract number. Sub-directories shall be created under the working directory and named as listed below. A maximum of 3 sub-directory levels below the project number directory is permitted. All project design files shall be located in the sub-directory named plans.

3.1 Folder Names - Preconstruction File Server

y:\newcastl\	County location
\999\	Road Number
\bridge\	Department's management section
\corridor\	
\road\	
\8902101\	Project Contract Number

Contract Folders

\cogo	coordinate data files
\dtm	surface network files
\misc	miscellaneous files
\plans	all plan sheet design files
\plot	construction plot files
\rpt	README, reports, letters
\rwplot	right of way plot files
\sections	all cross section design files
\status	FUTURE IMPLEMENTATION
\survey	all survey input data files
\xsplot	all cross section plot files

4.0 FILE NAMES

Standard name and file extensions shall be used for all files to indicate file type and content. Special key board characters shall not be used in the file name. Special characters are)(!@#$%^&*_-+=}]{[|\'"?/><~. Files of similar content shall be numbered sequentially. Before projects are archived naming conventions shall be adhered to. All construction document plan sheets shall be archived. DXF and DWG file formats shall not be archived. Support files shall be archived on a select basis. Support files are project geometry files, dtm network files, template libraries etc. An index file of non-standard file names shall be maintained and named "/rpt/README".

4.1 Design File Names

The design file names shall have a maximum of eight (8) characters. The file name, with full path through contract number, shall be placed at the lower right corner of all sheet borders. Multiple sheets in a single design file shall be annotated A,B,C etc. Design files of similar content are named as listed and are numbered sequentially. Files listed below with a (+) are generally referred to as construction plan sheets and produce multiple plots. See Section 9.0 PLOTTING for plotting levels, pen (plotting) tables, etc.

4.1.1 Construction Documents

Roadway Plans: File Name	Content
titleco.dgn	Construction title sheet
titlerw.dgn	Right of Way title sheet
gen0l.dgn	General notes and legend sheet (01 first of)
typ0l.dgn	Typical Section Sheet
isht01.dgn	Index Sheet
trav.dgn	Horizontal and Vertical Control
ties.dgn	Horizontal Tie Points and Elevation Data
+ cp0l.dgn	Construction Plan
	Public Hearing or Base Plans
	Construction (Directive) Plans & Profile
	Grades and Geometric Plans
	Construction Phasing - E & S C Plans
	Signing, Striping & Conduit Plans
	Right of Way Plans
	Utility Relocation Plans
	Lighting Plans
Profl0l.dgn	Profile Plans (separate if required)
Swm0l.dgn	Storm Water Mgnt. Plans (if required)
Mot0l.dgn	Maintenances of Traffic Overview
Rwmb0l.dgn	R/W Metes and Bounds Summary
Rwtab0l.dgn	Right of Way Tabulation Summary
Rwmz0l.dgn	R/W Mosaic
Detail01.dgn	Roadway Details

Bridge Plans:

Bridge plan sheet file name codes are listed below. Sequence numbers are used for multiple sheets.

File name	Description
ab0l.dgn	Abutment Details
as0l.dgn	Approach Slab Details
bd01.dgn	Bearing Details
bm0l.dgn	Beam Details (any type)
bo01.dgn	Boring Sheet
br0l.dgn	Bar Sheet
ct0l.dgn	Camber Table
cu0l.dgn	Culvert Details
dk0l.dgn	Deck Plan
ex0l.dgn	Expansion Joint
fd0l.dgn	Finished Deck Elevations
fr01dgn	Framing Plan
ft01.dgn	Footing Plan
md01.dgn	Miscellaneous Detail
pe0l.dgn	Bridge Plan and Elevation
pl0l.dgn	Pile Details
pr0l.dgn	Pier Details
ra0l.dgn	Bridge Railing Details
rf0l.dgn	Rigid Frame Details
sh0l.dgn	Sheet Pile Details
sp0l.dgn	Slope Protection Details
st0l.dgn	Standpipe Details
td0l.dgn	Timber Structures
ts0l.dgn	Bridge Typical Sections
wd0l.dgn	Wick Drain Layout
ww0l.dgn	Wing Wall or Retaining Wall Details
detour.dgn	Detour Plans
signal0l.dgn	Signalization Plans
quan0l.dgn	Quantity Summary
std*0l.dgn	Standards (* = standard name)

5.0 DESIGN FILE SETTINGS

The settings listed below shall apply to 2D and 3D plan sheet design files. The global origin of design files shall be established by the working units seed file. Metric and English unit seed files will be provided upon request. The default plotting height is 0.0 unless stated otherwise.

5.1 Plan Sheets

		English	Metric
Working Units:	MU	FT	m
	SU	TH	mm
Resolution:	SU	10	1000
	PU	100	10
Precision:	Distance	0.001	0.001
	Bearings	00^-00'-00.1"	00^-00'-00.1"
	Coordinates	0.0001	0.0001
	Elevations	0.01	0.001
	Area	0.0001	0.001

5.2 Detail Sheets

		English	Metric
Working Units:	MU	FT	m
	SU	TH	mm
Resolution:	SU	10	1000
	PU	100	10

5.3 Exception - Bridge Detail Sheets English Units

Working Units: MU = FT, SU = IN, SU = 12, PU = 1000

6.0 PROJECT ORGANIZATION

At final design or product delivery all plan sheet elements shall be geographically correct relative to the design file's north and east coordinate system and shall be based on Delaware State Plane Coordinate system. Detail sheet borders are always placed parallel to the x-y axis of the design file.

6.1 Plan Sheet Layout

Plan sheets shall be sequenced west to east or south to north. Project alignments shall be stationed likewise. Contours shall be placed or generated by software at true elevations. Plan sheet borders (one per design file) shall be placed nearly parallel to the project or roadway baseline to the nearest whole degree. Plan sheet border cell selection shall be based on the final plotting scale of the project (e.g. 1:300 for metric projects) Reference file use, during project development, is encouraged. Reference file elements displayed for preliminary through semi-final plotting shall be copied or moved to the sheet border design file and all reference files detached before delivered to the Department or archived.

6.2 Plan Sheet Content

Plan sheet match lines are typically established at 230 meter or 900 foot intervals. Match lines shall not be located at intersecting roadways. A design file shall include sufficient detail left and right of the existing roadway to include proposed limits of construction. Each design file shall include existing topography, proposed design, base lines and stationing, rights of way, utilities, traffic items, grades and geometric, erosion controls, construction phasing, and signing and striping, etc. All elements shall be clipped at the sheet match line. Feature annotation for areas shall be placed near the feature division line. Existing ground profile and proposed vertical alignments shall be place parallel to the sheet border if ample space exists. Vertical alignment match lines shall be placed "under" horizontal alignment match lines.

6.3 Detail Sheet Organization and Content

All detail sheets shall be drawn in the design file full size. Sheet borders shall be placed parallel to the x-y axis of the design file with the lower left corner of the first sheet border located at or near xy = 0,0. Plan sheets shall be sequenced left to right at uniform intervals. One design file may contain multiple sheets of similar type. Typical sections, cross sections, profiles etc. may be placed in the same design file provided design file size maximums are not exceeded. (See 14.4) Scanned raster images attached to 2-D or 3-D design files shall be permitted on a case by case basis.

7.0 PLAN SHEET STANDARDS

Department policy for plan sheet preparation and plotting centers on strict adherence to level assignments. Font cells are placed in design files to represent existing point detail. Linear patterns are used for fencing, ditching, woods, right of way etc. Lines are used for utility, property, and striping lines etc. Graphic cells, linear patterns, lines etc. are placed and annotated as proposed design. Shared cells should be used where ever possible. Annotation for points, lines and areas shall be placed if the symbology is ambiguous. Annotation for existing detail shall be placed on the same level as the element symbology. Features not specified in this policy may be grouped with features of similar type. A field audit or ground survey shall validate that all existing features were captured and annotated.

7.1 Design File Level Use

Level No.	Information for Base Plans
1	Alignment Features: previous contract centerline alignment and stationing, traverse points, match lines and match line stationing
2	Existing Flexible Pavement: edge of road, edge of shoulder, driveways parking lots, etc.
3	Existing Concrete Pavement: edge of road, edge of shoulder, face of curb or gutter, back of curb or gutter, sidewalk, etc.
4	Existing Natural Roadside Features: woods lines, trees, shrubs, wet lands, ditch centerline, stream edges etc.
5	Existing Manmade Roadside Fixtures: fences, property monuments and pipes etc. (private ownership)
6	Existing Drainage Fixtures (plan view): manholes' catch basins, pipes, head walls, etc.
7	Miscellaneous: north arrow, ties, bench marks, street names etc~
8	Existing Roadside Fixtures: junction wells, cabinet bases, pole bases, guardrail, sign foundations etc.
9	Existing Ground Profile: grid, profile text and stationing, drainage pipes and catch basins etc.
10	Soils Information: boring data and symbols (plan and profile)
11	Offset profiles
12	Major Highway Structures: bridges, culverts, etc.

13	Private Structures: houses, buildings, railroad rails, masonry walls etc.
14	Sheet Description - BASE PLANS: sheet number and misc text, etc.
15	Clear Zone Lines: dimensions

Level No.	**Information for Utility Plans (Public and Private)**
16	Existing Underground Utilities: gas valves, water valves, fire hydrants, mains on plan and profile, laterals, etc.
17	Existing Overhead Utilities: poles, service fixtures, etc.
18	Proposed Underground Utilities: gas main relocation, water main construction, conduits, etc.
19	Proposed Overhead Utilities: poles, guy wire anchor, etc.
20	Sheet Description - UTILITY: sheet number, misc. text, etc.

Level No.	**Information for Signing Striping and Conduit Plans**
21	Signing: existing and proposed posts and panels
22	Striping: centerline, edge line, parking stalls, turn lanes etc.
23	Signalization: proposed conduit runs, pole bases, cabinet bases, signal heads, etc.
24	Street Lighting: pole bases, luminaries, conduit
25	Phasing Diagrams: signal head layout, text etc.
26	Proposed Striping Text (proposed line width and color): dimensions, tabulation and sheet description - SIGNING STRIPING AND CONDUIT - sheet number and misc. text etc.

Level No.	**Information for Right of Way Plans**
27	Property Division Lines: right of way lines, property lines, existing easement lines, existing r/w baseline, dimensions, etc.
28	Ownership Records: owners names, county asmt no.'s,
29	Proposed Right of Way: lines and dimensions, etc.
30	Proposed Easements: (P.E. T.C.E. U.E.)

31	Proposed Text: metes and bounds, sheet description, proposed r/w baseline and stations, offsets, sheet description - RIGHT OF WAY and sheet number
32	Misc. Right of Way Data: r/w revisions

Level No.	**Information for Construction Sequence Phasing** (Maintenance of Traffic & Erosion Control Plans)
33	General: warning signs and text applicable to all phases.
34	Phase 1: paving area, m.o.t. signs, lane striping and dimensions, traffic flow arrows, barriers, erosion control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 1 - and plan sheet number
35	Phase 2: paving area, m.o.t. signs, lane striping and dimensions, traffic flow arrows, barriers, erosion\ control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 2 - and plan sheet number
36	Phase 3: paving area, m.o.t. signs, lane striping and dimensions, traffic flow arrows, barriers, erosion control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 3 - and plan sheet number
37	Phase 4: paving area, m.o.t. signs, lane striping and dimensions, traffic flow arrows, barriers, erosion control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 4 - and plan sheet number
38	Phase 5: paving area, m.o.t. signs, lane striping and dimensions, trafhic flow arrows, barriers, erosion control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 5 - and plan sheet number
39	Phase 6: paving area, m.o.t. signs, lane striping and dimensions, traffic flow arrows, barriers, erosion control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 6 - and plan sheet number
40	Phase 7: paving area, m.o.t. signs, iane striping and dimensions, traffic flow arrows, barriers, erosion control symbols, etc. sheet description CONSTRUCTION SEQUENCE PHASE 7 - and plan sheet number
41	Existing contours
42	Proposed contours (if needed or as directed)

Level No.	Information for Construction Plans
43	Proposed Horizontal Alignment: construction baseline stationing, event point annotation, curve data (if ample room exists), etc.
44	Proposed Pavement, Bridge and/or Structures: mainline, shoulder and driveway shapes for area fill, patching, butt joints, etc.
45	Proposed Misc. Concrete: curb, sidewalk, gutters, etc.
46	Proposed Drainage Plan and Profile: pipes, ditch, inlet and junction structures etc.
47	Proposed Schedules: pipe, manhole, junction box schedules, identifiers and leader Lines, etc. Sheet Description - CONSTRUCTION - and sheet number
48	Proposed Barriers: steel guardrail, p.c.c safety barrier, impact attenuators, terminal end sections and specialty transition
49	Proposed Vertical Alignment: grade line, profile grades, offset profiles etc.
50	Proposed Construction Limit: toe of fill and top of cut lines, text etc.
51	Proposed Fence: new, replacement, r/w etc. sheet description - FENCING (if needed or as directed)
52	Proposed Landscaping: plants, trees, ground cover, layout etc. sheet description - LANDSCAPING (if needed or as directed)
53	Construction Directive Text: miscellaneous dimension, identifiers, leader lines, saw cut location, etc.

Level No.	Information for Grades and Geometric Plans
54	Construction Layout: lane lines, cross slope change lines, face of curb layout lines, grade application "ticks"
55	Text Notations: vertical curve data, grades, station and offsets, dimensions, coordinate list, sheet description - GRADES AND GEOMETRIC and sheet number

Level No.	Items – Miscellaneous
56	Spot Elevations of DTM
57	Obscure Areas of DTM
58	DTM Network (Triangles if needed)
59	Break and fault lines not displayed for plotting - top of bank, bottom of bank, top of wall etc. for DTM
60	Edge of DTM
61	Feature Point Numbers
62	Sheet Borders and title block text
63	Not Used

7.2 Text

Point, linear and area annotation for existing features shall be placed on the same level as the element symbology. Only upper case text shall be used. Area annotation shall be placed near the feature division line. Line spacing shall be approximately 2/3 the text height. Justification for text shall be center-center. Justification for text nodes shall be left center. All text sizes listed are based on 1"=30' and 1:300 plotting scale. Text sizes are given in design file master units.

7.2.1 Standard

	Font	Text size (english)	Text size (metric)	Text weight
Existing	1	3.0	0.85	0
Proposed	23	3.6	1.00	2

7.2.2 Exceptions

	Font	Text size (english)	Text size (metric)	Text weight
Match line Stn.	117	7.2	1.5	
Profile Stn.	23	3.6	1.0	2
Maj. Contour Ex.				1
Title Box	117	7.2	1.75	
Sheet Title	117	4.2	1.3	

7.3 Line Styles and Linear Patterns

Default line style and weight for existing information shall be zero (0). Default line weight for proposed information shall be two (2). Linear patterns are being phased out and will be replaced by custom line styles. Either are acceptable as Department Standard.

	Default Style	Weight	Pattern	Custom Line Style
Base Plans				
Baseline Layout	0	0		
Match lines	0	4		
Flexible Pavement	3	0		
Gravel/Stones	3	0		
Concrete Pavement	0	0		
Natural Roadside Symbols	0	0		
Ditch	0	0		ap=ditch
Wet land line	0	0		ap=marsh
Woods or Woods line	0	0		ap=woods
Hedges or Hedge Row	0	0		ap=hedge
Manmade Roadside Symbols	0	0		
Brick Wall	0	0		ap=brick
Stone Wall	0	0		ap=stone
Metal Fence	0	0		ap=wrf
Wood Fence	0	0		ap=wdf
Rip rap	0	0		ap=riplin
Drainage Pipes (double line)	2	0		
Roadside Hardware	0	0		
Steel Guardrail	0	0		ap=sbgr
Wire & Post Guard fence	0	0		ap=wrgr
Profile				
Datum	0	2		
Vertical Grid	0	0		
Horizontal Grid	1	0		
Original Ground	3	0		
Drainage Pipes	2	0		
Offset Profile	4	0		
Drainage Structure	5	0		
Houses	0	5		
Minor Res. Structure (porch)	0	3		
Bridge or culvert	2	0		
Railroad tracks	0	0		ap=rr
Clear Zone	0	3		ap=cz
Utility Plans				
Existing Utilities	0	0		
Proposed Utilities	0	2		

Signing Striping and Conduit Plans

Existing Signing	0	0	
Proposed Signing	0	2	
Proposed Lane Striping	0	6	ap=lsde etc.
Stop bars	0	14	
Conduit	0	3	

Right of Way Plans

Existing Right of Way	0	0	ap=erw
Proposed Right of Way	0	2	ap=prw
Proposed Denial of Access Line	0	2	ap=da
Proposed R/W-DA Line	0	2	ap=rwda
Existing Easement	3	0	
Temporary Easement Line	3	2	ap=tce
Proposed R/W Baseline	0	2	

Phasing Plans

Temporary Striping	0	3	
Construction Phasing Details	0	2	
Contour Existing Major	2	1	
Contour Existing Minor	2	0	
Contour Proposed Major	0	3	
Contour Proposed Minor	0	1	

Construction Plans

Construction Baseline	0	2	
Proposed Paving	0	2	
Proposed Curb Type 1	0	1	ap=cb1
Curb Parkway Type 1	0	1	ap=cpw1
Proposed Curb and Gutter Type 1	0	1	ap=cag1
Curb and Gutter Type 2	0	1	ap=cag2
Curb and Gutter Type 3	0	1	ap=cag3
Proposed Closed Drainage (Pipes)	0	6	
Proposed Ditch	0	2	ap=ditchv
Proposed Identifiers	0	2	
Proposed Guardrail	0	1	ap=sbgr
Proposed Safety Barrier	0	1	ap=b1
Proposed Vertical Alignment	0	2	
Limit of Construction	5	2	
Proposed Steel Fence	0	1	ap=fncs

Default Style - Weight - Pattern - Custom Line Style

Wood Fence	0	1	ap=fncw
Proposed Landscaping	0	2	

Geometric Plans

Geometric Layout	0	2
Geometric Data	0	2

7.4 Shading and Area Pattern

Symbols for most proposed paving areas shall be plotted with area fill and pattern halftones. Shapes with specific line styles and level assignments shall be placed in the design file at z = 0.0. Halftone values are applied during plotting by designating a unique pen (plotting) table. Values listed below will plot with enough contrast for use on adjacent shapes. Halftone as "art work" is discouraged. A halftone value of 15 is white and a value of 0 is black.

7.4.1 Construction Sequence Phasing

(Maintenance of Traffic & Erosion Control Plans)

Level	Line Style	Halftone Value	Application
33-40	2	3	Temporary Roadway
34	3	6	Paving or Work Area Phase 1
35	3	6	Paving or Work Area Phase 2
36	3	6	Paving or Work Area Phase 3
37	3	6	Paving or Work Area Phase 4
38	3	6	Paving or Work Area Phase 5
39	3	6	Paving or Work Area Phase 6
40	3	6	Paving or Work Area Phase 7

7.4.2 Proposed Pavement Areas

Level	Line Style	Halftone Value	Application
44	1	10	Mainline Pavement
44	2	6	Shoulder Pavement
44	3	3	Entrance, Patching and Butt Joints

7.4.3 Proposed Sidewalk Areas

Active pattern sw10 shall be used for all proposed concrete sidewalk paving. Shapes used for 100 mm depth pattern areas shall be "dropped". Shapes used as 150 mm depth pattern areas shall remain as shapes to enable halftone shading.

Level	Line Style	Halftone Value	Application
45	2	6	Sidewalk at 150 mm

7.4.4 Proposed Drainage

Level	Line Style	Halftone Value	Application
46	0	1	Pipes in Profile

8.0 MISCELLANEOUS SHEETS

Construction detail sheets are prepared in a similar manner to roadway plan sheets. The major difference in their preparation is the use of multiple scales on a single sheet. Select roadway details may be assembled from cells and a sheet generation program. Detail sheets (22" x 36") are created with a maximum of 6 cells per sheet and are generally not to scale. Details are placed top row first, left to right by order of input data set. Text sizes shall be uniform for all sheets.

8.1 Detail Sheets

Roadway plan sheets are developed for plotting scales of 1"=30'-0" (1:300 metric) or 1"=50'-0" (1:500 metric). All detail is drawn full size and scale is achieved at plotting. For example, the standard sheet border cell to achieve a 1"=30'-0" scale measures 660' x 1080'. This would plot at 22" x 36". Proposed text height would measure 3.6 feet in the design file and plot at 0.12 inches. Detail sheets are prepared in a similar manner by scaling the standard sheet border cell based on the desired predominant scale of the details to be placed within the sheet border. Text is scaled similarly and most of the details are drawn full size. For example, suppose a detail sheet will contain four details. Three details are at a 1/2"=1'-0" scale and one detail will be at a scale of 1"=1'-0". The details are drawn full size and the detail to be shown at 1"=1'-0" is scaled up by a factor of 2. The standard sheet border cell is scaled up by a factor of 2 and placed around the details. Text is then placed after being scaled by a factor of 2.

8.1.1 Text

	Font	Plotted Text size TH	TW	Text weight
Titles	5	.25"	.20"	4
Sub-titles	5	.1875"	.150"	3
Dimensions And General Text	5	.125"	.100"	2
Title Block	117	.25"	.20"	

8.1.2 Levels, Line Styles and Weights

Level	Application	Line Style	Weight
1	Existing Object Lines	5	0
1	Existing Hidden Lines	2	0
2	Proposed Object Lines	0	1
2	Proposed Hidden Lines	3	0
2	Center Lines	4	0
3	Rebar	0	3
4	Stone Facing, Riprap	0	0
5	Dimension Lines, Terminators	0	0
5	Dimension and Directive Text	(See 8.1.1)	
9	Area Patterns	0	2
10	Sheet Title	(See 8.1.1)	
11	Area Shading	(See 8.1.3)	
62	Sheet Border	(Use Cell)	

8.1.3 Area Shading

Item	Level	Line Style	Halftone Value	Halftone Description
Fill	11	1	10	Light
	11	2	6	Medium
	11	3	3	Dark
	11	4	0	Black

8.2 Title Sheet

Title sheet design files are prepared for right of way and construction plans. Reference file maps are available for each county. As a minimum, the title sheet location map in the center of the sheet shall include the entire project limits. Major road names within the project limits shall also be displayed.

8.2.1 General Information

Level	Application	Line Style	Weight
1	Lines, arc etc. (Project Environment)	0	0
2	Lines, arc etc. (Project Location)	0	3
3	Shapes for Area Fill by Halftone	(See 8.1.3)	
4	Leadered Text	(See 8.1.1)	
5	Titles and general Text	" "	
6	English References	" "	
7	Metric References	" "	
62	Sheet Border	(Use Cell)	

8.2.2 Text

Data fields are provided for most text locations. Text size for additional notes shall set to match cell text.

8.3 Notes and Legend Sheets

The Department's standard construction plan legend is named legend.dgn and is exported from the server. This file is attached as a reference file for both english and metric projects. Project notes are generally added to the area below the General Notes. Conflicting symbols in the reference file attachment may be masked as needed.

8.3.1 General Information

Level	Application	Line Style	Weight
1	Existing Symbols		0
2	Proposed Symbols		2
3	Shapes for Area Fill by Halftone	(See 8.1.3)	
4	Dimension, Witness and Leader Lines	0	1
5	Titles and General Text		2
6	Dimensions (English) & 36x22 Sheet Border		
7	Dimensions (Metric) & 34x22 Sheet Border		
8	User placed text for existing utilities (ft=1;wt=0)		

8.4 Quantity Sheets

Level	Application
1 & 62	Created by program using cell libraries and input data files

8.5 Cross Section Sheet

Earth work cross section design files are grouped to correspond to plan sheet match lines. Cross section design file xs0l.dgn shall store all section information between match line limits of construction plan cp0l.dgn. Section labels and titles shall be consistent with baseline labels, street names and county road numbers.

Level	Application	Line Style	Weight
9	Cross Section Axis	0	1
9	Cross Section Grid	3	0
15	Clear Zone	0	3
16	Utility Test Hole Data	0	0
29	Proposed R/W	0	2
41	Existing Ground	5	0
42	Proposed Finished Grade	0	2
43	Baseline label (Station)	0	2
44	Sub-Grade Shapes	(See 8.1.3)	
45	Curbs	0	2
46	Drainage	0	2
48	Guardrail	(Use Cell)	
62	Titles and General Text		
62	Sheet Border	(By Reference File)	

8.6 Profile Sheet

Level	Application	Line Style	Weight
9	Existing Ground	5	0
9	Stations	0	2
9	Profile Grid (H)	4	0
9	Profile Grid (V)	0	0
9	Axis (L,B,R)	0	2
46	Drainage	(See 7.4.4)	
49	Proposed Vertical Alignment and Grades	0	2
62	Sheet Border	(Use Cell)	

9.0 PLOTTING

The Department produces 22" x 36" and 22" x 34" plans on bond paper for check plots and "master originals" for optical scanned reproduction. Plot request files are created interactively with the Microstation fence command and Cadnet Plotstation interface. Plot request are then routed to the queue configured by Plotstation.

9.1 Plot Attributes

Plot request files are created with specific levels on and off. View attributes always on for plotting are fill, line styles, weights, patterns, and text. View attributes generally off are text nodes and data fields.

Title Sheet

Levels On: 1-62
Reference file levels: As Required

Notes and Legend Sheet (rf=legend.dgn)

Levels On 1-62
Reference file levels: English Units, 1-6
Metric Units, 1-5,7

Base Plans

Levels On: 1-9,11-17,27-28,62 Optional levels: 41

Public Hearing Plans

Levels On: 1 -9,13,15,22,27-30,43-46,48-53,62 Optional level: 41

Construction Plan Sheet

Levels On: 1-13,15-17,27-30,43-S0,53,62

Grade and Geometric Plan Sheet

Levels On: 1 -3,9,13,43,45-46,49,54-55,62

Construction Phasing Plan Sheet (M.O.T. & Erosion Control)
Levels On By Phase: 1-6,8-9,13,27,29-30,33-34,41,43-46,49-50,62 / 33,35 / 33,36 / 33,37 / 33,38 etc. Optional level: 42

Signing, Striping and Conduit Plan Sheet

Levels On: 1-3,7,9,15-17,21 -23,26,27,29,30,43-45,49,62

A Right of Way Plan Sheet

Levels On: 1-9,11-13,16-17,27-32,45,49,50-51,62

Utility Plan Sheet

Levels On: 1-9,11,13,15-20,27,29-30,41,43,45-46,49,62

Cross Section Sheet

Levels On: 1-62

Signalization Plan Sheet
Traffic signal plans are prepared by the Department's Traffic Operations Section

Levels On: 21-26,62
Reference file levels on: 1-6,8-9,11-13,21-25,27,29-30,43-45,50

9.2 Plot File and Pen Table Names

Plot files with standard names are created and saved in the projects plot sub-directory. The plot file name indicates plan sheet type, plot sequence number for set composition, and pen (plotting) table used. Examples are listed below. Pen tables are used to modify element symbologies during plotting. Elements are either intensified or screened to emphasize the intent of the titled plot. Pen table names match the 2 character plan sheet codes in the plot request name.

Plan Sheet Name	**Plot File Name**	**Pen Table Name**
Title	titleco.prf	ti.tbl
General Notes	gen0l.prf	gn.tbl
Typical Section	typa.prf	dt.tbl
Index	isht0l.prf	cd.tbl
Construction	cp0lcd.prf	cd.tbl
Utility	cp0lut.prf	ut.tbl
Right of Way	cp0lrw.prf	rw.tbl
Grades & Geometric	cp0lgg.prf	gg.tbl
Constr. Sequence	cp0lcsl.prf	cs.tbl
Signing & Striping	cp0lss.prf	ss.tbl
Signal	signal0l.prf	ss.tbl
Hearing	cp0lph.prf	ph.tbl
Details	detc0l.prf	dt.tbl

9.3 Plot File Modifications (Interactive)

Modifications to the plot request file can be accomplished at the unix command line with Byers prfmod.

Command	Qualifier	Syntax
prfmod	display	prfmod /display=enter_data name.prf
	nodisplay	prfmod /nodisplay=enter_data name.prf
	level	prfmod /level=1 name.prf
	nolevel	prfmod /nolevel=1 name.prf
	nolevel	prfmod '/nolevel=(1,22-28)' name.prf
	tbl	prfmod /tbl=cd.tbl name.prf
	dgn	prfmod /dgn=cp0l.dgn name.prf
	units	prfmod /units=in name.prf
	rotation	prfmod /rotation=-15 name.prf
	scale	prfmod /scale=300 name.prf
	resource	prfmod '/resource=(font.rsc)' name.prf
	plotter	prfmod /plotter=name name.prf
	reference file	prfmod /ref=name name.prf

9.4 Check and Master Original Plots

The Department's Preconstruction plotter is a Versatech (8624) monochromatic with 400 dpi resolution and a maximum plotting width of 24". Each sheet in the construction and right of way plan document shall have a corresponding plot request file located in the project's plot or rwplot sub-directory. Read access to the plot sub-directory and all plot files shall be provided by the owner to all others in the group. For single sided, single 22" x 36" and 22" x 34" check or master plots from any unix workstation type: bps -b -p becxns -g pathname/name.prf

9.5 Plan Sets

For single sided full and half size plan sets, the Department has developed a procedure to route set requests to the Department' Oce 9800 raster plotter. The request will read all plot files in the specified directory and submit the job to the Oce9800 queue.

9.6 Color Plots

The Versatech Color electrostatic plotter (CE3444) is available for color displays and public hearing plans. State wide digital color aerial photos are available for small scale location plans. Pixel diameter precludes their use for plotting scales larger than 1" = 100'. To plot in color, IPLOT must be available on the workstation with the queue (to color) properly configured.

10.0 FONT LIBRARY

Microstation font resource files. (font.rsc) has been customized. Symbol fonts 89 and 90 for survey point features is available upon request.

Font Number	General Use
1	Existing Detail (Plan)
5	Detail Sheet
23	Proposed Detail (Plan)
89	Survey Feature (Plan)
90	Survey Features (Plan)
117	Titles (Plan)

11.0 COLOR TABLES

Colors for fills, lines and text can be assigned with color plotting tables. Generation of color plots for public hearing plans shall be determined by the Design Engineer.